

June 5, 2006

DECLARATION

The undersigned, Dana Scruggs, having an office at 8902B Otis Avenue, Suite 204B, Indianapolis, Indiana 46216, hereby states that she is well acquainted with both the English and German languages and that the attached is a true translation to the best of her knowledge and ability of PCT/EP 2005/053256 (INV.: DELFINI, S., ET AL).

The undersigned further declares that the above statement is true; and further, that this statement was made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or document or any patent resulting therefrom.

A handwritten signature in black ink, appearing to read "Dana Scruggs", with a long horizontal flourish extending to the right.

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Dana Scruggs

## JIGSAW MACHINE

## Background Information

The present invention is directed to a jigsaw machine according to the definition of the  
5 species in Claim 1.

A known hand-held jigsaw machine (DE 101 19 561 A1) referred to as a hand-guided  
jigsaw includes a pendulum device with a U-shaped holder fastened to the housing of  
the jigsaw and a support roller located between the holder arms that supports the saw  
blade on its back. The support roller is provided with a V-shaped groove in which the  
10 saw blade back is accommodated. To suppress a lateral deflection of the pendulum  
device transversely to the saw direction during sawing, guiding means are provided that  
are fastened to the housing of the jigsaw or to a base plate that supports the jigsaw on  
the workpiece to be sawed. The guiding means have a forked design and include guide  
jaws – which face each other – on the fork ends that clamp the holder of the pendulum  
15 device and specifically in the region of the holder in which the support roller is located.

A known, hand-guided jigsaw (WO 02/22297 A1) includes a support device with a  
support roller that supports the saw blade, in the saw direction, on its back and drives it  
as needed in the saw direction in a pendulum manner. To suppress a lateral deflection  
of the saw blade transversely to the saw direction during sawing, the jigsaw includes a  
20 guide device for guiding and providing lateral support of the saw blade that includes two  
guide elements that bear against the sides of the blade facing away from each other  
and a servomotor designed as a spring drive, with which the distance between the  
guide elements can be adjusted depending on the thickness of the saw blade. The  
guide device is coupled with a clamping device that holds the saw blade such that the  
25 guide elements lift away from the saw blade when the clamping device is opened and  
are placed against the sides of the saw blade when the clamping device is closed. The  
guide elements are designed as rolling bodies or ceramic parts, one each of which is  
located on the lever arm of a two-armed swivelling lever. The swivelling levers, which

are designed similar to the arms of tongs, are connected by a joint and engage – via guide bolts that extend out of their lever arms facing away from the guide elements – in grooves of a support component that extend away from each other in the longitudinal direction of the saw blade slightly diagonally at an angle of less than 6°. When the support component is displaced, the swivelling levers are swivelled via the groove flanks and the guide bolts. Two compression springs engage in the support component that load the support component in the longitudinal direction of the saw blade and attempt to displace the swivelling levers via the grooves and guide bolts such that the guide elements on the swivelling levers bear against the sides of the saw blade with spring preload.

### Advantages of the Invention

The hand-held jigsaw according to the present invention and having the features of Claim 1 has the advantage that, due to the manner of assembly of the support device and the guide device for the saw blade, a simpler design of the hand-held jigsaw machine is attained without negatively affecting the quality of support of the saw blade – which is required for a good sawing result – in the saw direction and transversely to the saw direction. Significantly fewer components are required for the support and guide device, which results in cost reductions in production and assembly. Due to the fact that the distance between the guide elements is manually adjustable, any saw blades is guided equally well transversely to the saw direction, independent of the thickness of the saw blades. Due to the measures listed in the further claims, advantageous refinements and improvements of the hand-held jigsaw described in Claim 1 are made possible.

According to an advantageous embodiment of the present invention, the guide elements are designed as guide disks that have an outer diameter that is greater than the outer diameter of the support roller and enclose the support roller between them. Preferably, one disk is designed integral with the support roller and the other disk is located on the support roller such that it is axially displaceable.

According to an advantageous embodiment of the present invention, to create a

variable distance between the guide disks, a displacement member is provided for the axial displacement of the guide disks that is coupled with a manual actuating member.

According to an advantageous embodiment of the present invention, the displacement member has two displacement disks that have a thickness that is variable across the circumference, one each of which is located between a guide disk and an arm of the holder. A compression spring located in the interior of the support roller presses the guide disks against the displacement disks and presses the displacement disks against the arms of the holder. When the displacement disks are rotated, the two guide disks are displaced relative to each other, and the axial distance between them changes. In fact, their axial separation can be adjusted depending on the thickness of the saw blade to be guided.

#### Drawing

The present invention is described in greater detail below with reference to an exemplary embodiment shown in the drawing.

- 15    Figure 1        shows a perspective view of a hand-held jigsaw machine in a schematic depiction,
- Figure 2        shows an enlarged depiction of a support and guide device for the saw blade in the hand-held jigsaw machine in Figure 1,
- Figure 3        shows a front view of the support and guide device in the direction of  
20                      arrow III in Figure 2,
- Figure 4        shows an exploded depiction of the support and guide device in Figures 1 and 2,
- Figure 5        shows a portion of an enlarged sectional view of the support and guide device in Figure 3.

#### 25    Detailed Description of the Exemplary Embodiment

The hand-held jigsaw machine or hand-guided jigsaw machine shown schematically in

Figure 1 has a machine housing 11 in which an electric motor is located, the electric motor having a gearbox for driving a lifting rod 12 to make an up and down reciprocating motion. A saw blade 13 is coupled detachably yet captively via its clamping shank to lifting rod 12. Saw blade 13, which includes a saw blade strip 131 and a saw blade back 132 facing away therefrom is guided through a passage 14 in a base plate 15 that is fixed to machine housing 11 and is placed on the work piece to be sawed when the hand-held jigsaw machine is used. The electric motor of the hand-held jigsaw machine is turned on and off using a push button 16 that is located on the underside of a handle 17 formed in machine housing 11.

To prevent the free end of saw blade 13 from deflecting during sawing and, therefore, to prevent a resultant low-quality cutting result, a support device 20 is provided that supports saw blade 13 in the saw direction, and a guide device 21 is provided that supports and guides saw blade 13 transversely to the saw direction. Support and guide devices 20, 21 are integrated in each other so that components of one device simultaneously perform functions in the other device. Support device 20 includes a U-shaped holder 22 with two arms 222, 223 that are interconnected by a transverse part 221. A support roller 23 is located between the ends of arms 222, 223 that supports saw blade 13 via its back 132. Holder 22 is guided in machine housing 11 in the saw direction behind saw blade 13 and is fastened there with its transverse part 221. Guide device 21 has two guide elements 24, 25 that rest on sides of saw blade 13 that face away from each other and accommodate saw blade 13 between them. The axial distance between guide elements 24, 25 is adjustable, so that saw blades 13 having different thicknesses can be guided between guide elements 24, 25 without wear.

Guide elements 24, 25 are designed as guide disks 26, 27 that have an outer diameter that is greater than the outer diameter of support roller 23 and enclose support roller 23 between them. Guide disk 26 is designed integral with support roller 23, and guide disk 27 is displaceably located on support roller 23. To change the axial distance between guide disks 26, 27, guide device 21 includes a displacement member for the axial displacement of guide disks 26, 27 that is coupled with a manual actuating member 29 to set a desired axial separation. Displacement member 28 includes two displacement

disks 30, 31. Displacement disk 30 is located between guide disk 26 and arm 222 of holder 22, and displacement disk 31 is located between guide disk 27 and arm 223 of holder 22. The two displacement disks 30, 31 are profiled on the side that faces arms 222, 223 and, as a result, have an axial thickness that varies around the circumference.

Arms 222, 223 have the same profile on their side facing displacement disks 30, 31, so that, when displacement disks 30, 31 are rotated relative to arms 222, 223, displacement disks 30, 31 are displaced axially relative to each other. Displacement disks 30, 31 are fastened rotatably to a shaft 32 supported in arms 222, 223, while guide disks 26, 27 and support roller 23 are rotatably mounted on shaft 32. Actuating member 29 in the form of a rotary knob 33 is non-rotatably connected with shaft 32 at one end of shaft 32. A snap ring 34 is slid onto the other end of shaft 32 and prevents shaft 32 from pulling out of arms 222, 223. As shown in Figure 5 in particular, a coaxial, cylindrical recess 35 is provided in support roller 23 that extends into guide disk 26 designed integral with support roller 23. Guide disk 27 also has a central, cylindrical recess 36 formed from the side of guide disk 27 facing support roller 23 outward, and the inner diameter of which is slightly larger than the outer diameter of support roller 23, so that guide disk 26 can extend above support roller 23 with minimal play. A compression spring 37 slid onto shaft 32 bears against the bottoms of recesses 35, 36 and presses guide disk 26 against displacement disk 30, and presses displacement disk 30 against arm 222, presses guide disk 27 against displacement disk 31, and presses displacement disk 31 against arm 223.

The components described are shown in Figure 4 in an exploded view, and assembled in Figures 2, 3 and 5. To non-rotatably connect displacement disks 30, 31 with shaft 32, displacement disks 30, 31 have a rectangular, central recess with which they are slid onto sections 321 and 322 of shaft 32, each of which has a corresponding rectangular cross section (Figure 4). Section 323 of shaft 32 that extends between these two sections 321 and 322 is cylindrical in order to accommodate guide disks 26, 27 and support roller 23. Sections 324 and 325 of shaft 32 that extend beyond sections 321 and 322 are also cylindrical, and they support shaft 32 in arms 222, 223 of holder 22.

When rotary knob 33 is rotated, displacement disks 30, 31 pressed against fixed arms

222, 223 of holder 22 are therefore rotated via shaft 32. Depending on the direction of rotation, the distance of guide disks 26, 27 from associated arm 222 or 223, respectively, increases or decreases depending on the increasing or decreasing thickness of displacement disks 30, 31. As a result, guide disk 27 slides onto support roller 23 more or less further and, as a result, the axial separation  $a$  between the end faces of guide disks 26 facing each other becomes smaller or larger and can therefore be adjusted for the particular thickness of the saw blade. Due to the fact that – as described – two identically designed displacement disks 30, 31 are positioned with mirror symmetry, the central position of the guide gap between guide disks 26, 27 is always retained for saw blade 13. Axial separation  $a$  between guide disks 26, 27 that is adjusted in this manner is retained via the stiction between the components of guide device 21.

Advantageously, an additional locking member 38 is provided that fixes shaft 32 in its particular rotary position in a non-positive and/or form-fit manner. Locking member 38 shown in Figure 4 includes a supporting arm 39 that is slid via an opening 40 onto shaft 32 such that it is located between rotary knob 33 and arm 222. Supporting arm 39 is attached via the free end to arm 222. Supporting arm 39 carries an axially projecting clamp 41 that presses on rotary knob 33 in a non-positive manner. As an alternative, locking member 38 – designed as a retaining plate with a locking projection – and rotary knob 33 can be provided with corrugation, in which the locking projection engages. The locking projection can be lifted out of the corrugation by swivelling the retaining plate.